

## 2013 Biannual Recertification

### WXJC Nighttime Facility

#### Birmingham, Alabama

03-18-2013

Radio Station WXJC, Birmingham operates at 50KW nominal day, 1KW nominal night. The night pattern is licensed pursuant to the moment method modeling provisions of 47 C.F.R. §73.151(c). The license for the modeled nighttime facilities was granted on September 17, 2010.

The sampling system consists of 5 identical sample loops mounted 37.277 meters above the base insulator. Each sample line runs from the loop, through a parallel-resonant isocoil, and finally, through a buried line into the transmitter building. As per standard engineering practice and the Rules, the following measurements were taken from the input connectors at the back of the Potomac Instruments 1901 antenna monitor to (and through) the connected sample loops.

An Agilent E5061 analyzer was used on 03-15-13 to obtain these values:

	Tower 1	Tower 2	Tower 3	Tower 4	Tower 5	Units
R at 850 KHz	6.9	6.8	6.9	6.8	6.9	Ohms
X at 850 KHz	-35.5	-35.4	-36	-35.5	-36	Ohms
Z at 850 KHz	36.164347084	36.047191291	36.655286113	36.145400814	36.655286113	Ohms
Mean Z at 850	36.333502283					Ohms
Deviation	-0.169155199	-0.286310991	0.3217838298	-0.188101469	0.3217838298	Ohms
Low 0 Freq	433.35	435	433.35	433.36	435.1	KHz
High 0 Freq	908.5	908.6	908.7	908.7	908.9	KHz
Low (-45) Freq	817.65	817.74	817.83	817.83	818.01	KHz
R @ -45	8.45	8.45	8.4	8.35	8.3	Ohms
X @ -45	49.4	49.3	49.7	49.5	48.1	Ohms
Calculated Z	50.117486968	50.01892142	50.404860877	50.199327685	48.810859447	Ohms
High (+45) Freq	999.35	999.46	999.57	999.57	999.79	KHz
R @ +45	9.2	9.1	9.3	9.1	9.3	Ohms
X @ +45	49.9	49.6	50.6	49.9	50.7	Ohms
Calculated Z	50.741009056	50.427869279	51.447546103	50.722973099	51.545901874	Ohms
Characteristic Z	50.429248012	50.223395349	50.92620349	50.461150392	50.178380661	Ohms

Shaded items are calculated; the unshaded values are those taken by measurement. All measurements were made at the sample line connection points to the Potomac Instruments 1901 antenna monitor in the transmitter building. The cells labeled "Z at 850 KHz" are the measured

impedances at the operating frequency. The “Deviation” cells are the calculated deviation from the mean.

The second group of measurements and calculations (the remainder of the spreadsheet) demonstrate that the characteristic impedances of each sample line are in compliance with the Rules. Using the Agilent analyzer, we first determined the zero-impedance frequencies of each line, with the sample loops attached. (As expected, the two zero-ohm frequencies are lower than measured in 2010, because this time, the loops were in the circuit; the 2010 measurements were open-circuited at the tower end).

We chose the “High 0 Freq(uecy)” as being the closest to the carrier frequency (850 KHz), then derived the + and - 45 degree frequencies from that (the “Low (-45) Freq” and “High (+45) Freq” values). The final row, showing the Characteristic Impedance, was calculated with the standard formula,

$$Z_0 = ((R_1^2 + X_1^2)^{1/2} \times (R_2^2 + X_2^2)^{1/2})^{1/2}$$

We thus conclude that the WXJC sampling systems meets the requirements of the Rules.

The final step was to check the field strength at several sample points on various radials, as detailed on the last page. The 95 and 195 degree radials are the maxima (“lobes”) and the remainder are minima (“nulls”).

Two comments about the field strength readings: the measurements taken in 2010 were done during a relatively dry period. These most recent measurements were done after weeks of heavy rain (including several days of deluge from Tropical Storm Isaac). Also, the 14.5 kilometer distance on the 336 radial, and the 9.40 kilometer distance on the 299 radial, suffered from severe man made interference.

I noted in general that man-made interference has increased everywhere and across the board, especially in populated areas.

## Field Strength Measurements

°T	Dist, KM	Nearest Address, Zipcode	N Lat	W Long	mV	Date	mV	Date	Time	mV	Date	Time
22	3.11	651 Carson Road, 35217	33 39 01	86 44 04	55	03/27/13	58	09/12/12	11:46 AM	46	05/25/10	10:43 AM
22	4.70	5424 Red Hollow Rd, 35215	33 39 49	86 43 40	32	03/27/13	34	09/12/12	11:39 AM	26	05/25/10	10:28 AM
22	9.53	100' N of Turkey Creek WTP	33 42 13	86 42 28	3.8	03/27/13	3.8	09/12/12	11:18 AM	4.5	05/25/10	10:10 AM
26	3.97	5221 Red Hollow Rd, 35215	33 29 23	86 43 40	31	03/27/13	33	09/12/12	11:42 AM	27	05/25/10	10:35 AM
26	5.79	5674 Red Hollow Rd, 35215	33 40 16	86 43 10	29	03/27/13	20	09/12/12	11:34 AM	22	05/25/10	10:23 AM
26	8.91	≈.3 mi S of Turkey Creek WTP	33 41 47	86 42 16	6.5	03/27/13	6.4	09/12/12	11:22 AM	6	05/25/10	10:15 AM
50	3.48	1326 Sunhill Rd NW, 35215	33 38 41	86 43 07	4.1	03/27/13	4	09/12/12	10:52 AM	3.1	05/24/10	12:55 PM
50	5.10	691 26th Ave NW 35215	33 39 14	86 42 17	3.1	03/27/13	3.2	09/12/12	10:58 AM	2.4	05/24/10	12:27 PM
50	8.86	3192 Cobblestone Dr, 35215	33 40 31	86 40 24	1.5	03/27/13	1.5	09/12/12	11:07 AM	1.1	05/24/10	12:37 PM
95	3.88	721 Carson Road, 35215	33 37 18	86 42 19	35	03/27/13	36	09/12/12	12:28 PM	39	05/24/10	01:05 PM
95	5.46	1305 Huffman Rd, 35215	33 37 13	86 41 18	23	03/27/13	24	09/12/12	12:33 PM	18	05/24/10	01:12 PM
95	7.06	1366 Springville Rd, 35215	33 37 07	86 40 16	16	03/27/13	15	09/12/12	12:40 PM	13	05/24/10	01:21 PM
139	3.77	505 Lawson Rd, 35217	33 35 56	86 43 13	5.3	03/27/13	5.2	09/12/12	12:54 PM	4	05/24/10	11:21 AM
139	4.76	59 Roebuck Drive, 35215	33 35 32	86 42 48	3.1	03/27/13	3.0	09/12/12	01:01 PM	2.25	05/24/10	11:11 AM
139	5.87	9059 Parkway East, 35206	33 35 05	86 42 19	1.9	03/27/13	1.7	09/12/12	01:07 PM	1.25	05/24/10	11:02 AM
195	3.44	2487 Valley View Dr, 35217	33 35 40	86 45 24	93	03/27/13	90	09/12/12	10:28 AM	95	05/24/10	01:48 PM
195	4.71	1499 Bethel Ave, 35217	33 35 01	86 45 37	70	03/27/13	68	09/12/12	10:20 AM	64	05/24/10	10:15 AM
195	6.43	4764 Inglenook Ln, 35217	33 34 07	86 45 54	29	03/27/13	30	09/12/12	10:05 AM	36.5	05/24/10	10:34 AM
261	4.03	1825 Carson Rd, 35217	33 32 07	86 47 24	2.8	03/27/13	2.6	09/12/12	12:10 PM	2.6	05/25/10	11:15 AM
261	6.72	2028 Hickory Ln, 35068	33 36 54	86 49 08	1.9	03/27/13	2	09/12/12	02:50 PM	1.7	05/25/10	11:31 AM
261	9.84	3525 Shady Grove Rd, 35068	33 36 37	86 51 07	.24?	03/27/13	.24	09/12/12	03:00 PM	.24	05/25/10	11:47 AM
299	3.32	New Castle Rd, ≈ .16 mi W of Cypress Street	33 38 19	86 46 43	4	03/27/13	5	09/12/12	11:59 AM	4.6	05/25/10	11:06 AM
299	6.64	102 Gardendale Dr, 35071	33 39 12	86 48 36	0.98	03/27/13	1	09/11/12	02:30 PM	.95	05/24/10	03:12 PM
299	9.40	5391 Brewer Rd, 35071	33 39 56	86 50 09	0.43	03/27/13	.42	09/11/12	02:22 PM	.42	05/25/10	12:05 PM
336	2.21	1324 Carson Rd, 35217	33 38 33	86 45 24	4.7	03/27/13	4.8	09/12/12	01:31 PM	4.9	05/25/10	01:31 PM
336	3.60	4268 New Castle Rd, 35071	33 39 15	86 45 46	4.4	03/27/13	4.5	09/12/12	10:50 AM	4.4	05/25/10	10:50 AM
336	14.5	8211 Miller Pl, 35116	33 44 35	86 48 40	.02?	03/27/13	.02	09/11/12	02:05 PM	.02	05/25/10	12:28 PM

? - severe interference

**We conclude from the above that the night pattern for WXJC AM continues to satisfy the Rules and Regulations regarding a modeled directional antenna array.**

Prepared by the Chief Engineer,  
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03-18-13